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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,154	02/06/2004	Harald Kaspar	58561US004	7304
32692	7590	01/11/2005	EXAMINER	
3M INNOVATIVE PROPERTIES COMPANY			HU, HENRY S	
PO BOX 33427			ART UNIT	
ST. PAUL, MN 55133-3427			PAPER NUMBER	
			1713	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/774,154

Applicant(s)

KASPAR ET AL.

Examiner

Henry S. Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment of October 12, 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of: *(see office action on p.2) H.H.*
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2 pages.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. It is noted that the examiner has received an IDS filed on May 10, 2004, and a **duplicate** IDS filed on October 12, 2003.

This Office Action is in response to the Amendment filed on October 12, 2004. **Claims 9-10 were amended, and no new claim was added.** To be more specific, **Claims 9-10** were only rewritten with a method to overcome the 101 and 112-2nd rejections as suggested by the examiner.

With respect to the specification objections (a) - (c), the Applicants have corrected all typographical informalities as suggested by the examiner. Since the Applicants have provided the receipt for certified copy of priority document **EP 03075848.6, the priority date of 3-25-2003 is thereby granted.** However, **the examiner still requests the Applicants to send in a copy of EP 03075848.6 for scanning into the IFW file for future reference.** In view of above amendment, the examiner thereby withdraws the specification objections, and 101/112-2nd rejection of office action dated 7-9-2004 are now removed. In view of Applicant's argument (see pages 8-11 of Remarks), the examiner also withdraws the 102 and 103 rejections for Claims 1-10 of office action dated 7-9-2004. However, **claim objection on Claim 1 is still sustained with the same reason.** **Claims 1-10 are now pending.** An action with new set of rejection follows.

Claim Objections

2. Claim 1 is objected to because of the following informalities:

On **Claim 1** at lines 10-11, sentence of “and (c) optionally one or more comonomers selected from non-gaseous fluorinated monomers and non-fluorinated monomers, said fluoropolymer having long chain branches.” may be improper since it may be also optional for said fluoropolymer to have long chain branches. Regrouping is needed. The examiner suggests moving the phrase of “said fluoropolymer having long chain branches” to Claim 1 at line 2 and to be located after “320°C.”.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bekiarian et al. (US 4,612,357) or Bekiarian et al. (EP 0,208,305 A2), each individually in view of Worm et al. (US 6,734,254 B1).

The limitation of parent Claim 1 of the present invention relates to a fluoropolymer that is melt-processible and thermoplastic and that has a melting point between 100 °C and 320 °C, said fluoropolymer being derived from (a) one or more gaseous fluorinated monomers; (b) one or more modifiers selected from (i) olefins having a bromine or iodine atom bonded to a carbon of the double bond of the olefin, (ii) olefins having a formula (I) of $X^a_2C=CX^a-R_f-Br$ wherein X^a is H, F, Br, Cl, or I; R_f is perfluoroalkylene, perfluorooxyalkylene or perfluoropolyether group and (iii) mixtures thereof; and (c) optionally one or more comonomers selected from non-gaseous fluorinated monomers and non-fluorinated monomers, said fluoropolymer having long chain branches. Other parent Claim 7 relates to the process of making fluoropolymers of Claim 1. See other limitations of dependent Claims 2-6 and 8-10.

5. Regarding the limitation of two parent Claims 1 and 7, Bekiarian et al. in both US and EP patents, disclose the preparation of melt-processible, thermoplastic tetrafluoroethylene copolymers comprising units of tetrafluoroethylene, iodo(perfluoroalkyl) ethylene and optionally a third comonomer such as $R_f-CF=CF_2$ or $R_f-O-CF=CF_2$ (column 1, line 50-64;

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abstract, line 1-4; title). Bekiarian et al. has further disclosed that the copolymers are melt-processible with melt viscosity can be measured at the processing temperature of 320-400 °C. It is noted such a statement reads on the limitation of melting point of 100-320 °C due to the fact in the art that processing temperature is always higher than melting point. With respect to the limitation of “said fluoropolymer having long chain branches”, Bekiarian has already disclosed that **by keeping iodo(perfluoroalkyl) ethylene in small amount, a copolymer with long chain branches rather than crosslinking of carbon atoms will be obtained** (column 1, line 1-20).

6. However, the Bekiarian reference is silent about using an olefin with a bromine or iodine atom bonded to the carbon atom of the double bond of the olefin or an olefin corresponding to formula (I) of Claims 1 and 7. Worm et al. teach that in the course of making curable composition, the **bromine and iodine atoms may be incorporated in the “fluoroplastic” by using monomers such as 4-bromo-3,3,4,4-tetrafluoro-1-butene, bromotrifluoroethylene (BTFE) and the like** (column 2, line 27-33). In a close examination, both 4-bromo-3,3,4,4-tetrafluoro-1-butene and bromo-trifluoroethylene (BTFE) are fully reading on the claimed modifier’s structure with formula (I) in Claim 1-(b); while the iodine-containing analogs such as iodo(perfluoroalkyl) ethylene, which is exactly the same compound as 4-iodo-3,3,4,4-tetrafluoro-1-butene are certainly included inside Worm’s disclosure. The advantage is that such reactive bromine or iodine atoms enable the fluoroplastic to participate in a cure reaction (column 1, line 60 – column 2, line 26; column 1, line 14-21). Therefore, **the above Worm-mentioned olefins are functional equivalent and thereby are interchangeable.**

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7. In light of the fact that all the involved references are preparing the same or similar type of curable compositions **comprising the bromine- or iodine-containing olefins as modifier**, one having ordinary skill in the art would therefore have found it obvious to modify Bekiarian's polymer composition by replacing iodo(perfluoroalkyl) ethylene monomer with its bromine-containing analogs or the one with a bromine or iodine atom bonded to the carbon atom of the double bond as taught by Worm. By doing so, **one would expect such an exchange to be successful as usual**. Additionally, such a bromine-containing cure-site monomer would **still allow a copolymer with long chain branches rather than crosslinking of carbon atoms**.

8. Regarding **Claim 2**, tetrafluoroethylene and the like is specifically used as major monomer.

Regarding **Claims 3-4**, Worm has taught the use of **bromotrifluoroethylene (BTFE)** as discussed in Claim 1. In a close examination, it is fully reading on the claimed modifier's structure with formula (I) as $X_2=CX-Z$ in Claims 3 and 4.

Regarding **Claims 5-6 and 8**, a third comonomer such as $R_f-CF=CF_2$ or $R_f-O-CF=CF_2$ (column 1, line 50-64; abstract, line 1-4; title) is included, thereby it includes hexafluoropropylene or a perfluorinated vinyl ether.

Regarding **Claim 7**, the modifier monomers are used in an amount of **not more than 0.03 wt %** of total weight (column 1, line 54-58; see examples 1-2 on columns 6-7).

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Regarding **Claims 9 and 10**, the copolymers can be **extruded into shaped articles** such as **wire** (column 1, line 8-9 and 23-36).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to melt-processible and thermoplastic fluoropolymer, which comprises units of fluorinated monomers and one or more modifiers from olefins having a bromine or iodine atom bonded to a carbon of the double bond of the olefin, or olefins having a formula (I) of $X^a_2C=CX^a-R_f-Br$:

US Patent No. 4,745,165 to Arcella et al. discloses the preparation of a curable fluoroelastomer comprising VDF, HFP, PAVE, 0.01-1 mol% of a brominated fluorovinyl ether having a formula of $Br-CF_2-(R_f)_n-O-CF=CF_2$ and some bromine-containing chain transfer agent (abstract, line 1-25; column 2, line 34-68). However, the copolymer is not **melt-processible and thermoplastic** since the fluorinated copolymers are only elastomers.

10. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Henry S. Hu

January 10, 2005


BERNARD LIPMAN
PRIMARY EXAMINER